



Addis Ababa University
School of Commerce, Graduate Program

An Assessment of the Monitoring Practices in Projects Contracted to YOTEK Construction PLC

**A Project Work Presented in Partial Fulfillment of the Requirements for the Award
of Master of Arts Degree in Project Management**

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DECLARATION

I, Zerabruk Bekele, hereby declare that this research titled “*An Assessment of the Monitoring Practices in Projects Contracted to YOTEK Construction PLC*” is my original work and that it has never been submitted to any University.

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Signature

Date

This research project has been submitted for examination at the School of Commerce (AAU) with my approval as a Supervisor.

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Abstract

This research aimed to assess the monitoring practices in projects contracted to YOTEK construction PLC. An effort was made to identify the strengths, weaknesses, and challenges to the monitoring practices. It was a descriptive research where quantitative data was collected through questionnaires distributed to all the staffs involved in monitoring. The data was analyzed on SPSS and MS Excel, and the findings inductively interpreted. An acceptable response rate of 90.7% was achieved but the response rates for the open-ended questions were not satisfactory. The research found out that about half of the staffs assigned for monitoring responsibilities need trainings in project management. Tools, systems, and applications were sufficiently available but financial constraint was straining the practice. Aspects of monitoring plan and its implementation were good, but some components of the plan such as acceptable performance levels were not properly communicated. The data collection was frequent and flexible thereby contributing to data quality, though information overload was a downside. The project reporting at YOTEK had some important attributes for effectiveness: Timely, flexibly scheduled, tailored to audience, and participatory. But independent performance reviews aiming for unbiased, impartial assessment of the work were less common. Furthermore, a weakness was noted in taking corrective action as per the findings of the performance reviews. One of the interesting findings was that the weaknesses and strengths were not exclusive to each other, but project specific at times. The implication of this observation is that the monitoring practice was not highly consistent or it was not integrated across projects. The researcher recommends YOTEK to build an integrated monitoring system so as to ensure optimal resource utilization. It is also recommended to conduct trainings to familiarize staffs to the monitoring tools and systems, to resolve the financial constraint and the communication lapses that were affecting the monitoring practice.

Key words: monitoring plan, data quality, effective reporting, performance review

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Acronym

CSF	Critical Success Factors
EVM	Earned Value Management
ETB	Ethiopian Birr
FDRE	Federal Democratic Republic of Ethiopia
GTP	Growth and Transformation Program
IFRC & RC	International Federation of Red Cross and Red Crescent Societies
ILO	International Labor Organization
LFA	Logical Framework Approach
M&E	Monitoring and Evaluation
MoWUD	Ministry of Works and Urban Development
PLC	Private Limited Company
PMI	Project Management Institute
RBM	Results Based Management
UN	United Nations
UNDP	United Nations Development Program
YOTEK	Yohanns Teklai

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Chapter One: Introduction

Ethiopian construction firms need to effectively monitor their projects for success if they are to be competitive in and benefit from a sector that continues to be a major budget recipient. Constructions in Ethiopia, roads that received 12.06% of the latest federal budget (CEPHEUS, 2019) included, suffer from quality defects, schedule and cost overruns. A study by Jekale et al (2017) on federal road projects in southern district revealed the average cost overrun to be 21.52% while average time delays was 427 calendar days. Out of the 40 factors identified as causes for the overruns the lack of monitoring during pre and post contract stages ranks third.

Effective project monitoring remains an important project management function because of the economic and social implications of failures to deliver projects within the specified quality, schedule, and cost constraints. Project managers are advised to consider, plan, and implement monitoring from inception to completion of projects (Callistus & Clinton, 2018) because effective project monitoring is one of the critical factors for project success (Kamau & Mohamed, 2015). Yet, little is known about the project monitoring practices at the local construction firms that are supposed to be competitive and contribute to the nation's ambition to be a middle-income country by 2025.

At a time when foreign contractors are taking over major construction works in Ethiopia, this research investigates the monitoring practices at a prominent local construction firm that is undertaking public buildings and road construction works. Through a descriptive research, the study attempted to assess the monitoring practices at YOTEK's projects in Addis Ababa, its challenges, and the factors that support the monitoring and those undermining it.

In this research it was found out that YOTEK is well positioned in terms of some resources for monitoring such as human resource, tools, systems, and applications. The quality of the monitoring data, its accessibility and report timing are some of the positives. On the other hand, budgetary constraint, inconsistency in monitoring practices, communication and coordination lapses are noted to be negatively affecting the monitoring.

1.1 Background of the Study

Construction activity is an important component in the economy of most of the countries because of its contribution to gross domestic product (GDP) and employment as well as being a market for materials and products produced by other sectors of the economy. A survey by Global Construction 2020 (2011) forecasts the world construction spending to rise from \$7.2 trillion in 2010 to \$12 trillion in 2020 (Das & Ngacho)

The construction industry in Ethiopia where public and private sectors are investing hugely is also in a boom. According to the Ethiopian National Planning Commission (2016) the construction sector has been a major driver both in terms of growth and structural change within the industry sector. Its contribution to GDP was 4% in 2009/10 and expanded to 15.9% during the 2015/16 fiscal year (African Economic Outlook, 2017). Currently Ethiopia is undertaking major construction projects in transport infrastructures (railways, airports, roads, and expressways), industrial parks, irrigation and hydroelectric dams.

Ethiopia has a Construction Industry Policy in a bid to realize its vision to be a middle-income country by 2025 which partly depends on the existence of a reliable and competitive local construction industry that is capable of delivering quality services and value for money in the development and maintenance of the physical infrastructure (Ministry of Urban Development and Construction, 2012). The policy aims to ensure efficient and cost effective performances on constructed facilities in line with best

practices. With regard to improvement of Quality and Productivity the policy direction targets effective supervision and promotes self-regulatory mechanisms.

At the time the policy was drafted (2012) the share of local contractors, in terms of value, was about 58% in the road sector but nearly 100% for buildings. Though the goal of the policy was to develop an internationally competitive industry that will be able to undertake most of the construction projects in Ethiopia, foreign companies have a growing share in the industry. Domestic contractors are even lacking the capacity to execute complex projects on subcontracting terms as seen on the Bole airport expansion project (Ethiopian Business Review, 2020).

As a project grows in size and complexity, the ability to plan, monitor and control the project becomes a key project management function (Raut et al 2013). Amid a growing involvement of foreign companies in major construction projects in Ethiopia, the project monitoring capabilities of the local firms need to be examined.

As listed by ConstructionProxy, in 2017 there were 133 Grade-1 and 53 Grade-2 contractors in Ethiopia under private, public, or foreign ownership. About a third of the Grade-1 contractors were General Contractors, licensed for both road and building constructions. The subject of this project work, YOTEK Construction PLC, belongs to this category.

YOTEK was established in 1998 and registered as a Grade-1 General Contractor in 2008. The Company has four business lines: Buildings, Roads, Real-estate, and Air-Fields. According to its company profile YOTEK is fully equipped with modern machineries and tools in accordance with the applicable regulations of the FDRE Ministry of Works and Urban Development.

So far YOTEK has carried out projects worth more than 9 billion Birr and currently has projects worth 4.5 billion Birr at hand. Some testimonial letters that appreciate YOTEK for its good performance were reviewed. Clients testified their satisfaction with YOTEK's

efficiency and sufficiency in resources, its well-organized team, fast execution, and its excellence in quality performance. This research enquires into the project monitoring practices under such acclaimed performance at YOTEK.

1.2 Statement of the Problem

The Urban Development and Housing Program identified limited capacity in project monitoring and control as one of the challenges to the Ethiopian construction sector (2016). Furthermore, a research by Tadesse Ayalew et al (2016) listed time management, cost management, and resource management to be the top three challenges in the Ethiopian construction projects management. Although significant progress was made in increasing domestic capacity in this area, there was still a big gap compared to the required capacity (National Planning Commission, 2016).

Some construction projects contracted to local companies are noted for poor quality, schedule delays, and cost overruns. The Riib dam in Gondar is one such a case. At contracting to the Ethiopian Construction Works Corporation, it was planned to be completed within four years at 1.6 billion Birr. But it lasted for 10 years, costing 3.7 billion Birr (Zenebe, 2018).

On the other hand the Chinese Communication Construction Company completed the Akaki-Adama expressway and the Lebu-Akaki-IT Park-Goro road that connects it with Addis Ababa ahead of schedule (Expo group, 2016). Contrasting performances between local and foreign contractors could be leading to preference for foreign, especially Chinese, firms. According to the Johns Hopkins University (2020) the Gross Annual Revenues of Chinese Companies' Construction Projects in Ethiopia (in million Dollars) was 2,291.7 in 2012, growing to 6,832 in 2014 before falling to 4,001.8 in 2018.

The implication of local contractors not delivering construction projects within the planned budget and schedule is not limited to a policy failure to develop a competitive Ethiopian construction industry. In their research on Sub-Saharan Africa projects, Gbahabo and Ajuwon (2017) listed Pareto-inefficient allocation of resources, further

delays and cost escalation, negative public perception, loss of job and income, and at the worst total project abandonment as the effects of cost and schedule overruns. . Furthermore construction projects entail large penalties or damages for project delays (PMI, 2016)

Despite the critical importance of monitoring for project success, little is known about how monitoring is practiced at the local construction firms. Consequently, the specific factors affecting their project monitoring are not fully identified which in turn affects the progress towards effective monitoring. Thus, this study seeks to assess the project monitoring practices at YOTEK construction PLC by conducting a quantitative survey on its six projects in Addis Ababa in an effort to draw some conclusions towards better monitoring practices in construction projects.

1.3 Research Objectives

Main objective

The main objective of this study is to assess the monitoring practices at the road and building projects in Addis Ababa that are contracted to YOTEK construction PLC.

Specific objectives

The specific objectives of this research are to,

- Assess the monitoring practices at YOTEK's projects in Addis Ababa
- Identify the internal factors that are supportive to the monitoring practices and those that rather are undermining it
- Identify the challenges, external to a particular project team, that are affecting the monitoring practice

1.4 Research Questions

In this research six construction projects will be surveyed mainly to answer the following questions

- ✓ How is monitoring practiced at the construction projects contracted to YOTEK?
- ✓ What internal factors are affecting the monitoring practices at YOTEK?

- ✓ What are the challenges to the monitoring practices at YOTEK's projects?

1.5 Significance of the Study

The research papers and policy documents discussed so far have monitoring, follow-up, and control as common challenges in the Ethiopian construction sector. Thus it would be interesting to see if there are any positive developments recently with respect to monitoring by taking YOTEK as a case.

As the company under study is one of the leading local construction firms, the findings of this research could be taken as lessons by those contractors who have monitoring as their weaker side. Furthermore, since this research is done purely for academic purposes it is likely that the participants' opinions are sincere and hence helpful for the company to work on its limitations.

1.6 Scope of the Study

This research will be limited in its scope to the construction projects contracted to YOTEK Construction PLC and only the active projects located within Addis Ababa are to be considered.

1.7 Limitations of the Study

The first limitation was that the responses given to the factors impacting the monitoring practices were fewer than expected. Respondents were asked to add to the suggested list of challenges affecting monitoring, but they didn't and hence the analysis was limited to ranking their ratings on the suggested list. Second, the research was not detailed enough to make comparative analysis among projects and between sectors (road-versus-buildings) because of time constraint.

Chapter Two: Literature Review

2.1 Definitions of Monitoring

The various definitions of monitoring as provided by organizations, practitioners and researchers differ in their context but not in content, as could be observed in the two definitions below

“Monitoring is the routine collection and analysis of information to track progress against set plans and check compliance to established standards. It helps identify trends and patterns, adapt strategies and inform decisions for project/programme management.” (IFRC & RC, 2011)

*“**Monitoring** is a continuous process of collecting and analyzing information about a programme, and comparing actual against planned results in order to judge how well the intervention is being implemented.” (ILO)*

In the researcher’s view, monitoring is not only a continuous performance-versus-plan comparison for corrective actions. Monitoring is also a process where lessons learnt in due course of project implementation are employed to tune the plan for the project deliverables ahead.

2.1.1 Common Types of Monitoring

Projects involve several deliverables. The performance of a project is thus to be viewed from different perspectives through various parameters. Accordingly there are a number of types of monitoring that collectively help to track progress against plan.

Some of the common types of monitoring as listed by IFRC & RC (2011) are:

- A. Results monitoring** tracks effects and impacts. This is where monitoring merges with evaluation to determine if the project is on target towards its intended results (outputs, outcomes, impact) and whether there may be any unintended impact (positive or negative).
- B. Process (activity) monitoring** tracks the use of inputs and resources, the progress of activities and the delivery of outputs. It examines how activities are delivered – the efficiency in time and resources. It is often conducted in conjunction with compliance monitoring and feeds into the evaluation of impact.
- C. Compliance monitoring** ensures compliance with donor regulations and expected results, grant and contract requirements, local governmental regulations and laws, and ethical standards.
- D. Context (situation) monitoring** tracks the setting in which the project operates, especially as it affects identified risks and assumptions, but also any unexpected considerations that may arise. It includes the the larger political, institutional, funding, and policy context that affect the project
- E. Beneficiary monitoring** tracks beneficiary perceptions of a project, their satisfaction or complaints with the project, participation, treatment, access to resources and their overall experience of change. It should take account of different population groups, as well as the perceptions of indirect beneficiaries
- F. Financial monitoring** accounts for costs by input and activity within predefined categories of expenditure. It is often conducted in conjunction with compliance and process monitoring
- G. Organizational monitoring** tracks the sustainability, institutional development and capacity building in the project/programme and with its partners

2.2 Planning for Monitoring

“Clear objectives and STAKEHOLDER commitment drive successful projects”

(The World Bank, 2005)

Monitoring starts at planning or project design because without proper planning and clear articulation of intended results, it is not clear what should be monitored and how; hence monitoring cannot be done well (UNDP,2009)

An effective project planning is critical to the success of a monitoring process which in turn is a crucial component of a successful project. Therefore, it should be ascertained that monitoring will not be seriously influenced by the following project design weaknesses (Umhlaba Development Services, 2017)

- A poorly planned project influenced by the attitude and commitment of the people and partners involved in the project and how they relate and communicate with each other.
- The project lacks logic in its strategy and has unrealistic objectives. In this case the indicators will not produce useful information and that information will not be used in the best possible way
- Enough resources not allocated to the monitoring system (including funding for information management, participatory monitoring activities, field visits, etc)
- The more rigid a project design is, the more difficulty the project team will have in adjusting it as a result of change in the context and understanding of interim impacts

Planning involves determination of missions, goals, and strategies to achieve the predetermined objectives thereby providing the bases for implementation, monitoring and evaluation of activities. One of the strategies to manage the whole project cycle in a professional way is the RBM (Results Based Management) which itself has the Logical Framework Approach (LFA) as a tool for systematic planning, implementing, monitoring,

and evaluating projects. The LFA and other monitoring and evaluation frameworks are discussed below.

2.3 Monitoring and Evaluation Frameworks

Frameworks and models are used as planning tools for monitoring and evaluation. These tools are schematic designs displaying the directional linkages between key program elements and/or planned results, and other relevant factors. The M&E frameworks assist to develop clearly understood program/project goals and measurable, long-term, short-term, and intermediate objectives (UNDP, 2009)

I. The Conceptual Framework

A Conceptual Framework identifies and illustrates the relationships between all relevant systemic, organizational, individual, or other main factors that may influence program/project operation and the successful achievement of program or project goals. The Conceptual Framework serves some M&E purposes such as guiding indicators identification and impact analysis, but it cannot be a basis for M&E (Omotayo, 2017)

II. The Logic Model

The logic Model is similar to the Results and Logical Frameworks, but presented differently and with a wider scope as it is not limited to the results but includes a clear plan for the use of resources to meet the desired goals and objectives. An underlying assumption of logic models is that there is a linear relationship flowing from program inputs to processes/activities, which, in turn, result in outputs that ultimately lead to long-term outcomes and impact (ICF International, 2008)

III. The Results Framework

A *program-level* planning and management tool to monitor the achievement of results and to adjust relevant programs and activities is the Results Framework. According to the Department of Health at the District of Colombia (2011) the Results Framework Approach has a lot in common with the *Logical Framework* which is used on *individual project basis*. But a document by the World Bank (2004) states that the logical

framework has a wider scope as it helps to clarify objectives of any project, program, or policy.

The Results Framework approach is meant to be simple and straight forward in design and, therefore, it does not require specialized skills. It is a systemic approach to documenting the logic of a strategy and its subsequent management, monitoring and performance measurement to ensure that the intended results have been achieved.

The Results Framework has a '*Big picture perspective*' since it incorporates the contribution of stakeholders necessary to achieve relevant goals and objectives. It also outlines the development hypothesis implicit in the strategy and the cause-and-effect linkages between the goal, strategic objectives and specific programme outcomes. (CPD unit, 2012)

IV. The Logical Framework Approach (LFA)

The LFA is an analytical process and set of tools used to support objectives-oriented project planning and management. It provides a set of interlocking concepts which are used as part of an iterative process to aid structured and systematic analysis of a project or programme idea (Miklic, 2007)

The Logical Framework Approach (LFA) has the Logical Framework Matrix (LogFrame) as its output or as an actual policy document (Myrick, 2013). During implementation the LogFrame serves as a useful tool to review progress and take corrective action.

The LogFrame helps to clarify objectives of any project and identify the expected causal links in the following results chain: inputs, processes, outputs, outcomes, and impact. It leads to the identification of performance indicators at each stage in this chain, as well as risks which might impede the attainment of the objectives (The World Bank, 2004)

Having incorporated the M&E in the project design, the M&E framework should be developed along the following steps (Umhlaba Development Services,2017)

1. Establish the purpose and scope – Why do we need M&E and how comprehensive should it be?
2. Identifying performance questions, information needs and indicators – What do we need to know to monitor and evaluate the project in order to manage it well?
3. Planning information gathering and organizing – how will the required information be gathered and organized?
4. Planning critical reflections process and events – How will we make sense of the information gathered and use it to make improvements?
5. Planning for quality communication and reporting – What, how and to whom do we want to communicate in terms of our project activities and processes?
6. Planning for the necessary conditions and capacities – What is needed to ensure that the M&E system actually works?

V. A Pragmatic Approach to M&E

In the Logical Framework Approach clearly defined indicators and outputs contribute to a rigid time consuming structured logframe. In practice managers resort to shortened forms of an imposed logframe, a pragmatic coping mechanism that is used when time and resources do not allow for the implementation of detailed logframes (Myrick, 2013)

This Pragmatic Approach and Planning for M&E would entail measuring risk by considering two factors:

Factor 1: The impact of the measurable objective under consideration.

Factor 2: The likelihood that objective will have an impact.

Essentially, a pragmatic approach to M&E could first involve evaluating risk, say using some decision making framework and then modeling the results of the analysis by way of a two parameter grid (of impact and likelihood) indicating low, medium or high outcomes on an *X and Y* axis. While practitioners will find it beneficial to measure risk as part of the M&E process, limited time and resources may cause them to further simplify the monitoring process

Impact			
High	7	8	9
Med.	4	5	6
Low	1	2	3
	Low	Med	High
	Likelihood		

Table 1. M&E Grid to Summarize Risk Analysis (Myrick, 2013)

After evaluating, summarizing and illustrating risk in this manner, the next step would be to determine the resources required to facilitate the achievement of the objective. Eventually the application and process of monitoring and evaluation progresses from a logical framework approach, to being altered to a more flexible, orderly pragmatic process and finally to a point where in the real world it becomes necessary to streamline processes due to a limitation of resources.

2.4 Performance Measurement

Performance measurement is the regular collecting and reporting of information about the inputs, efficiency and effectiveness of projects (Takim et al,2003). Theoretical comparisons of measurement systems have indicated that different systems are suitable for different situations. 'Activity based ratios' technique for example is more suitable for short-term applications than 'The Variance method'. Here follow brief descriptions of the commonly used monitoring tools that are applicable to construction projects cost and schedule monitoring.

A. Earned Value Management (EVM) for cost monitoring

Earned Value Management (EVM) is a powerful methodology that enables stakeholders to visualize projects status throughout their life cycles and manage them more effectively. EVM integrates scope management, cost management, and time management. It requires the periodic monitoring of actual expenditures and the amount of work done expressed in cost units (Virle & Mhaske, 2013)

A comparison of budget versus actual spending does not indicate the worth of the construction work completed at any given time. But EVM effectively and objectively measures the actual work performed by comparing three cost indicators: the budgeted value of work scheduled with the earned value of physical work completed and the actual cost of work completed (Waris et al 2012)

Cost Variance (CV): It is the difference between the worth of the work that has been done (or earned value, EV) and the amount of money that was spent to do it (Actual Cost, AC).

$$CV = EV - AC$$

A positive value of CV shows that the project spending is less than the planned budget whereas the negative value shows cost overrun.

Performance efficiency is measured by the EVM Cost Performance Index, CPI, and the Earned Schedule (ES) Schedule Performance Index, SPI (t).

Cost Performance Index (CPI): It indicates the efficiency of resource use and measures the worth of the work that is achieved for every single unit dollar spent.

$$\text{CPI} = \text{EV} \div \text{AC}$$

A ratio less than 1.0 suggests performance inefficiency.

B. Earned Value Cost Analysis and Forecasting

EVM is not only an 'indicator', it is also a 'predictor' as it both examines the current and forecasts the future cost performances of projects. EVM monitors and forecasts the cash flows and cost overruns which may happen during the project cycle, helping the project team to plan for contingency strategies to ensure the successful completion of project (Waris et al 2012).

Indicators	Planned Value	PV		What is the estimated value of the work planned to be done?
	Earned Value	EV		What is the estimated value of the work actually accomplished?
	Actual Cost	AC		What is the actual cost incurred for the work accomplished?
	Cost Variance	CV	$EV - AC$	Negative means Over Budget
	Cost Performance Index	CPI	EV/AC	Contractor is getting only x\$ out of every \$ spent into the project
	Schedule Variance	SV	$EV - PV$	Negative means project is behind Schedule
	Schedule Performance Index	SPI	EC/AC	Project is only progressing at — % of the rate planned
	Critical Ratio	CR	$CPI * SPI$	Overall Performance of the Project
Predictors	To Complete Performance Index	TCPI	$(BAC - EV) / (BAC - AC)$	$TCPI > 1$ indicates a need for increased performance for the remaining work in order to stay within budget
	Estimate At Completion	EAC	BAC / CPI	Currently estimate that total project will cost \$...
	Variance at Completion	VAC	$BAC - EAC$	Negative means - Contractor currently expect to be X\$ over budget when the project is completed
	Estimate to Complete	ETC	$EAC - AC$	Contractor need to spend X\$ to finish the project $(BAC - EV) / CPI$
	Independent Schedule at Completion	ISAC	BAC / SPI	Calculate final cost depending upon schedule performance at that date

Table 2: Indicators and Predictors used in Earned Value Management (Virle & Mhaske, 2013)

Transforming the EVM metrics to time or duration metrics yields the Earned Schedule Management (ESM), which has the following elements:

Actual Time (AT): the duration from project beginning to status date

Schedule at Completion (SAC): the original planned duration to complete the project

Earned Schedule (ES): This is the duration from the beginning of the project to the date on which PV should have been equal to the current value of EV.

ES = % Complete x SAC

Time Variance (TV): $TV = ES - AT$

A negative TV implies that the project is behind schedule.

C. Simplified Schedule Index

Simplified Schedule Index is calculated for each (Key) task of the project (unlike the SPI in the EVM method, calculated for the whole project). The SSI basically compares how much work has been accomplished considering how much of the time allocated to the (key) task in question has gone by.

In order to maintain its simplicity, the SSI assumes linear progression of all data used, which is very often not the case. An SSI > 100% indicates the task is progressing ahead of schedule (Pszenica, 2005)

D. Ratios for cost monitoring

1. Leading parameter

In 'unit costing' the actual costs are divided by the quantity of work of each type that has been done (Potts, 2008). Similarly in the 'Leading parameter' technique one or more of the major types of work are picked as measures of the performance of the whole project. For example, in a project where concreting forms a large portion of the work, the amount of concrete poured at any one time of the project can be used as a measure of the performance of the work. But if the leading parameter being used for assessment is no longer good enough for the purpose, it should be dropped for a better one. (Al-Jibouri, 2013)

2. Activity based ratios

The ratios between the earnings and expenditures of the project activities are employed as measures of performance, the performance of the whole project as well as that of the activities (Al-Jibouri, 2013). The three ratios the system relies on for the calculation of performances are:

- ✓ **Planned Performance** =Planned Earning/Planned Expenditure
- ✓ **Actual Performance** =Actual Earning/Actual Expenditure
- ✓ **Efficiency** =Actual Performance/Planned Performance

As long as a plan is available these ratios can be calculated at any time, over any duration, for a whole project or a section of it. The measures used by this technique are both simple to calculate and interpret, requiring little data.

2.5 Data Quality

Data quality is the degree to which data represents the true situation or represent reality faithfully. Zikmund et al (2010) list data quality along with relevance, timeliness, and completeness as characteristics of valuable information. Others add validity, accuracy, and consistency to the metrics in measuring data quality.

- ✓ **Accuracy** indicates whether data is void of significant errors.
- ✓ **Consistency** specifies that two data values pulled from separate data sets should not conflict with each other. However, consistency does not automatically imply correctness
- ✓ **Completeness** is having the right amount of information enabling to draw conclusions.
- ✓ **Validity** refers to indicators that neatly measure the intended performance levels
- ✓ **Relevance** is the characteristics of data reflecting how pertinent these particular facts are to the situation at hand

- ✓ **Timeliness** tells if data are current enough to be still relevant. It measures the time between data is expected and the moment it is readily available for use.

2.6 Performance Reporting

Performance reporting involves the development and dissemination of documents and exhibits that show the status of the project at a given point in time. Performance reports should indicate where the project currently stands (*Status reporting*), accomplishments since the last status report (*Progress reporting*), and what is expected to be accomplished in the next period (Lewis, 2005)

Construction projects can fail for many reasons and one contributing factor can be ineffective project reporting systems. Yet implementing an effective project reporting system is one of the most difficult project management challenges. This is because project reporting requires coordinated information and integration from all project phases and construction activities – ranging from initiation and planning to project closeout and commissioning (KPMG, 2014)

According to KPMG the three components of an effective project reporting system are transparency and accuracy, clearly defined objectives and purpose, and reporting layout, timing, level of detail, and distribution.

Stakeholders demand accurate and transparent project information for making informed decisions and ensuring compliance with Regulations, Acts, and other project requirements. Stakeholders should be able to drill down to the source data, as there are multiple opportunities for irrelevant data to creep into project status reports. Redundancy, the same data reported by different sources, should be checked as it often creates confusion and can lead to duplicate of entries or misreporting of key data.

If a project reporting system requires a high volume of manual adjustments or if large variances occur among reports and with project owner's accounting system, it requires further evaluation and remediation. Reports communicate different information and provide different levels of detail. However this information should not contradict itself

The second component for effective project reporting is that it should have clearly defined objectives and purpose. The reporting system has to facilitate decision making by providing management with accurate and meaningful information. An effective project reporting system should be able to synthesize large volume of data in simple and meaningful dashboards, snapshot reports, and summary reports. It should also facilitate knowledge sharing by providing information in simple, easy-to-understand formats. Providing quick and comprehensive support for regulatory proceedings in a timely and efficient manner, without the need for ad hoc reports or manual preparation of information is also an objective to the reporting system.

The third component contributing to effective reporting is the reporting layout, timing, level of detail, and distribution. The report layout impacts the ability to communicate the underlying information effectively and is often as important as the information being reported. A common reporting format is the Project dashboard that includes the important project metrics presented on a single page for quick, meaningful, and actionable information. Summary management report, risk report, and summary cost report are some other reporting formats to be used as required.

The timing and frequency of project reports should correspond with those dates required by management and stakeholders. The projects should also have an established communication plan that includes a distribution matrix for all project reporting documents

2.7 Performance Reviews

Costs and time can quickly get out of hand on construction projects where production conditions are volatile. The management needs to make a timely performance review based on the cost and time control information received from the field. This timely information allows the project manager to evaluate alternatives and take corrective action while an opportunity still exists to rectify problem areas. (Clough et al 2008)

From development projects perspective reviews such as rapid assessments and peer reviews, are distinct from evaluation and more closely associated with monitoring. They are periodic or *ad hoc*, often light assessments emphasizing operational issues. Unlike evaluations conducted by independent evaluators, reviews are an internal exercise, based on monitoring data and reports that help to make informed decisions for effective project/programme implementation. (UNDP, 2009)

James P. Lewis (2005) says that in the construction projects there are three kinds of reviews: status, design, and process. A status review concentrates on schedule, budget, scope, and performance requirements. Some of the reasons to conduct periodic project reviews are to improve project performance, to ensure that the quality of project work does not take a back seat to schedule and cost concerns, to reveal developing problems early, and to identify areas where other projects (current or future) should be managed differently. Furthermore reviews keep client(s) informed of project status to ensure that the completed project will meet the client's needs and reaffirm the organization's commitment to the project for the benefit of project team members.

Performance reviews are also tools for performance reporting when they are typically set up to present the current status of the project. They can be formal or informal, and the depth of the content will depend on the audience

2.8 Monitoring Best Practices

A monitoring system should adequately track, and thus effectively support the achievement of projects goals. To that end a monitoring system should adopt some standards. The performance reporting process as stated by Pszenica (2005) , the characteristics of good monitoring practices discussed in the Red Cross monitoring guideline (2011), and points from other literatures on M&E are summarized as best practices for the purpose of this research

- ✓ Link the monitoring plan to the Strategic Plan and Work-plan.
Monitoring and evaluation should be built into the project at the planning stage. It should not be an ‘add on’ that happens at the end, but should be woven throughout the project.
- ✓ Monitoring data should be **well-focused** to specific audiences and uses. Performance reporting should be limited to key tasks and deliverables, providing only what is necessary and sufficient.
- ✓ Monitoring should be **systematic**, based upon predetermined indicators and assumptions.
- ✓ Monitoring should also look for unanticipated changes with the project and its context, including any changes in project assumptions/risks; this information should be used to adjust project implementation plans.
- ✓ Monitoring needs to be **timely**, so information can be readily used to inform project implementation. Instead of generating reports at a given frequency, updates must take place whenever change occurs (real-time reporting)
- ✓ Whenever possible, monitoring should be **participatory**, involving key stakeholders – this can not only reduce costs but can build understanding and

- ownership. Stakeholders should be involved in reviewing the process of adoption and implementation and in setting future performance targets
- ✓ Monitoring information is not only for project management but should be **shared** when possible with beneficiaries, donors and any other relevant stakeholders. Broad dissemination and discussion of results at all levels enable an exchange of information, creative thinking, and innovative solutions to issues.
 - ✓ Monitoring should be **cost-effective** and **user-friendly** for the operating unit (simplicity, surveys calculated quickly)

2.9 Findings from Empirical Literatures

The researcher didn't come across studies on the construction projects monitoring practices or the factors affecting the effectiveness of contribution projects monitoring in the Ethiopian context. A review of a broader study on the project management practice in Ethiopia was made as an introductory, followed by reviews of researches from fellow African countries.

A study at the London School of Economics (LSE) which reported the project management practice in Ethiopia to be second from bottom in Africa, followed only by Mozambique, motivated Ayalew et al (2016) for an Assessment on Performance and Challenges of Ethiopian Construction Industry. Their results revealed that the level of construction project management practice in terms of adapting general project management procedures, project management functions, tools and techniques to be unsatisfactory. Particularly, the level of practice in terms of safety, risk and time management was found to be very low. The amount of schedule slippage ranges between 61%-80% and that of planned costs and other variables such as risk, quality, resources utilization and safety deviates in the range 21%-40%.

The challenges to the construction industry in Ethiopia were also identified by the assessment to be schedule overruns, poor quality, inappropriate procurement systems, failure to cope with project requirements, and the inability to adopt best practices. A ranking analysis on the challenges revealed time, cost, and risk to be the top three challenges. But the researchers didn't forward any policy recommendations where effective monitoring should have been emphasized.

Callistus and Clinton (2016) found out that the implementation of monitoring and evaluation in the Ghanaian construction industry was facing numerous challenges and as a result the industry was performing poorly. They identified and evaluated the barriers faced by projects in the implementation of monitoring and evaluation in the construction industry. Weak institutional capacity, limited resources and budgetary allocations for monitoring & evaluation, weak linkage between planning, budgeting and M&E, weak demand for and utilization of monitoring and evaluation results and finally, poor data quality, data gaps and inconsistencies were identified as the most significant barriers in the implementation of project M&E in construction projects.

Later in 2018, Callistus and Clinton did an extensive desk review to explain the role of monitoring and evaluation in construction project management throughout the life cycle of project delivery. They noted that the practice of monitoring and evaluation appeared to be side-lined whereas other project management areas were given much attention. The research discussed M&E challenges under three broad categories; technical level, organizational level, and project level challenges. They listed limited financial resources for M&E, weak institutional capacity of M&E departments or team, and the weak linkage between project planning and M&E among the biggest challenges to M&E. And they argued that despite such challenges, projects are completed to quality, cost, schedule, health and safety regulations and to the satisfaction stakeholders when M&E is implemented effectively. But the researchers question the possibility of implementing M&E effectively under all these challenges.

The study concluded that effective M&E has critical role in improving construction project implementation if the project implementers are providing adequate resources, technical capacity building, a conducive project environment, and if they allow stakeholders to participate in M&E activities. In order to reduce the risk of re-work, which in turn increases project cost and time, the authors advised project managers to consider, plan and implement M&E from inception to completion of projects. This advice is in line with other literatures that advise M&E plan to be included in the project plan and M&E to be implemented from start to finish of projects.

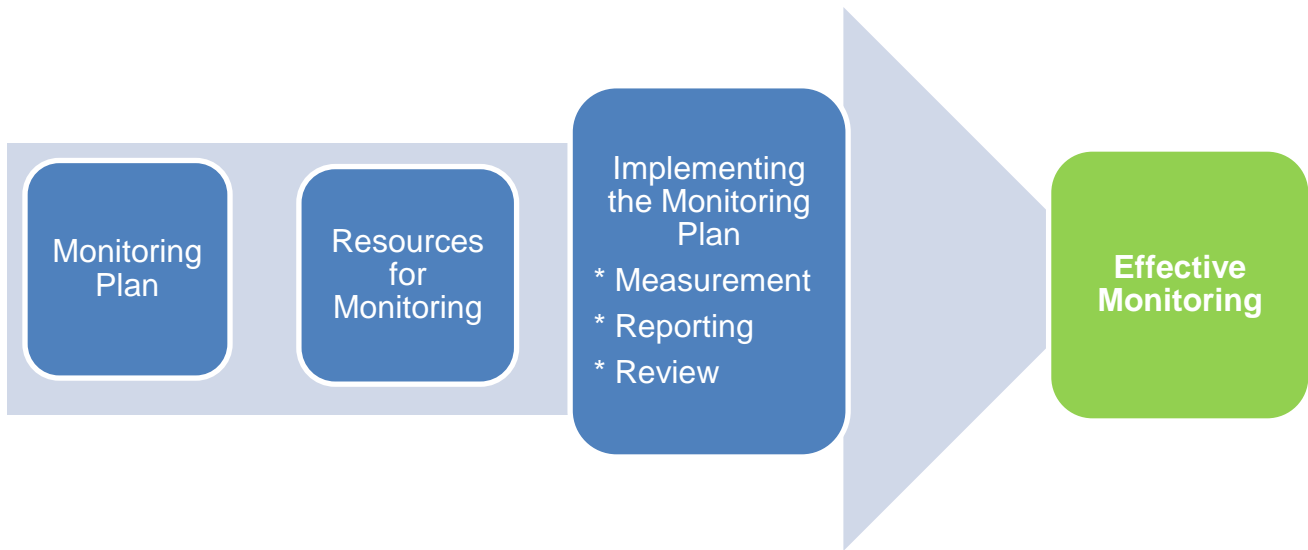
Kamau and Mohamed (2015) made an empirical review of previous researches for a study on the efficacy of monitoring and evaluation in achieving project success in Kenya. The researcher reviewed studies that aimed to determine the critical success factors (CSFs) which contribute to project success. The M&E function was one of the CSFs that consistently appeared in the reviewed studies. All the factors identified were grouped into four main categories which are: Strength of M&E team, monitoring approach adopted, political influence and project lifecycle stage.

It was conceptualized that effectiveness strength of monitoring team, approach used by M&E team in evaluating projects, and the stage of project lifecycle will influence project success whereas management support was depicted as a mediating variable between M&E and project success.

2.10 Conceptual Framework

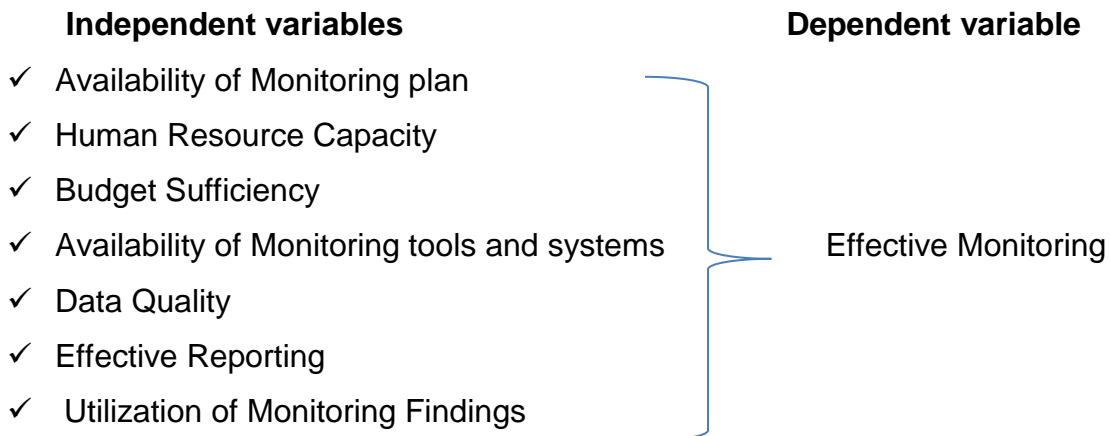
The ultimate goal of any project monitoring activity is to have a successful project. Effective monitoring practice in turn is dependent on other factors. Based on the literature review for this research, the following relationship can be defined among the factors that lead to an effective monitoring practice.

Figure-1 : Framework for effective monitoring (based on literature review)



Source: adapted from various literatures by the researcher

The above conceptual framework emphasizes the need for a monitoring plan that is built into the execution phase as of the project design. The monitoring plan defines the resource requirements and how monitoring should be practiced. The independent variables that constitute the monitoring plan, resources, and implementation collectively determine the monitoring effectiveness.



Chapter Three: **Research Methodology**

3.1 Research Design

Descriptive research “describes the characteristics of objects, people, groups, organizations or environments” and tries to portray a given situation accurately (Zikmund et al, 2010). To that end, *Descriptive research* makes fact-finding enquiries to report what has happened or what is happening (C.R. Kothari, 2004).

In the same way, this research assesses the monitoring practices at YOTEK’s projects against the monitoring practices as identified through a literature review on project/program monitoring. Survey method, which typifies a descriptive research, was used for data collection. Questionnaires were dispatched to project staffs contributing to the monitoring practices to measure their attitude and opinion.

The research approach was inductive where the resulting quantitative data was analyzed through descriptive statistics so as to produce an accurate representation of the project monitoring practices at YOTEK.

3.2 The Study Population

YOTEK was undertaking four building and two road projects in Addis Ababa. The project team members who were contributing to the project monitoring were engineers with varying roles (Construction, Contract, Planning, etc), project manager, project administrator, Office head, laboratory technician, and Surveyor.

At the head-office, the planning and monitoring department had four staffs with monitoring responsibilities, but only one of them was available at the time of data collection. Two project follow up engineers and a senior manager were overseeing the projects. Census was preferred to sampling since the staffs involved in the monitoring practices, both at projects and at the head-office, were not too many.

3.3 Data Collection Method

Primary data was collected through a survey by administering questionnaires at project sites and in the head-office. The questionnaire was made simple and direct so that the respondents understand what was required of them. Two questions were reverse-phrased to reduce response-bias, the tendency of respondents to give the same answer to every question. For instance instead of stating the question on budget to imply “there is no budgetary constraint”, it was reverse phrased as “Budgetary limitation is hindering the monitoring practices”.

The questionnaire was organized under eight parts. The five parts were used to collect quantitative data. The sixth one, part three, had four questions that ask respondents to add more cost and schedule monitoring methods, monitoring technologies, and applications to the ones listed for selection.

The closing two parts on strengths, weaknesses, and challenges to the monitoring practices were open-ended or semi-open-ended. The inclusion of these open-ended questions was intended to provide greater richness to the data collected so far through fixed-alternative questions.

3.4 Data Analysis and Presentation

SPSS version 23 was used to analyze the quantitative part of the collected data. Frequencies, means, one-sample T-test were run for the analysis. The responses for the open-ended questions were coded and summarized on Excel sheets. The code building was based on thoughts and not on words of the respondents. The coded responses were entered into the SPSS for analysis. Microsoft Excel was preferred for presenting the outputs of the analysis on graphs and tables because unlike SPSS it recommends the type of chart based on the data entered to it.

Chapter Four: **Results and Discussion**

4.1 Introduction

In the subsections to follow, the data collected by questionnaires is analyzed through descriptive statistics and interpretations provided on the findings. For this analysis an acceptable response rate was achieved from all six targeted projects and the five staffs at the head-office. A total of 43 questionnaires were handed out and 41 of them returned. Two questionnaires were incomplete (aborted) and thus excluded. The remaining 39 questionnaires, at a 90.7% response rate, were analyzed.

4.2 Personal and Project Profile

In this study YOTEK staffs from four building projects, two road projects and the head-office were involved. Twenty-nine respondents had responsibilities for the building projects, nine for the road projects, and one was from the planning and monitoring department at the head-office.

4.2.1 Respondents by Job Position

Three of the 39 respondents who completed the questionnaire declined to disclose their position. The remaining 36 were distributed across 16 job roles.

- ❖ Construction engineer (1) , Contract engineer (1), Planning engineers (2), Site engineers (3), and Office engineers (19) sum up to 26
- ❖ One respondent was involved from each of the following positions : Project administrator, Office head, Laboratory technician, Superintendent, Surveyor
- ❖ A project manager, Project follow up engineers (2), and two senior managers from the head-office

4.2.2 Education and Project Management Training

Four respondents held Master's degree, 32 of them got first degree and three others had Diplomas. Data was collected on the level of the project management trainings provided. The training was at Masters Level for two of the respondents, one was at Bachelors, three at certificate and the eleven staffs received short-term training. That means less than half (44.7%) of the respondents were trained in project management, and hence a skills gap analysis should be conducted to determine the project management training needs at each project.

4.2.3 Experience in Project Related Jobs

Two-third (66.7%) of the respondents had less than 5 years of experience in project related jobs. Twelve respondents (30.8%) worked in projects from 5 to 10 years, one had an experience exceeding 10 years, and that sets the average experience in projects at 4.48 years.

4.3 Planning for Monitoring

The aim of this section was to see if the projects had monitoring plans from the start and if that plan was being implemented. Indicative questions were forwarded to that end. The first question asked if all acceptable data collection tools were selected before the start of project implementation. Three-quarters of the respondents (78.4%) confirmed that the decision to select the data collection tools was part of the project plan while three respondents (8.1%) stated otherwise and five others (10.5%) were not sure about this.

Having the indicators and the acceptable performance levels documented in the monitoring plan is one thing, but communicating them to stakeholders is essential too. Almost all respondents (94.9%) agreed that indicators were well communicated while only two (5.1%) did not have that opinion. But the percentage of respondents who were aware of the acceptable level of performance drops to 84.2% while the remaining 15.8% were either unaware or not sure about it and thus they cannot tell when a project begins

to get out of track. The result implies that YOTEK has a commendable but not all-inclusive practice of communicating the monitoring plans to the project teams.

Another important aspect of a monitoring plan is an exhaustive list of the monitoring roles and responsibilities to be assigned to the project team so as to ensure every monitoring activity has got an owner and won't be left unattended. In this regard almost all respondents (92.3%) confirmed that the roles and responsibilities of staff in monitoring were clearly defined and documented, with only 7.7% of the respondents disagreeing.

One of the purposes of a monitoring plan is to provide guidelines so that monitoring is not conducted at will, rather systematically. To that end the monitoring plan should be adhered to, though with acceptable flexibility to allow for changes in assumptions and risks. So, participants of the survey were asked if their project was being monitored as per the documented policy or guideline for monitoring. It was found out that monitoring plans were generally executed at YOTEK as evidenced by 89.2% of the respondents who agreed to the statement while a combined 10.8% disagreed to it or were not sure whether monitoring was being guided by a plan.

Taking the responses given to the five questions raised in this section as indicative of the practices in monitoring planning, it could be concluded that monitoring practices at YOTEK are well supported by a plan

4.4 Resources for Monitoring

The resources requirement as stated in the monitoring plan should be made available if a project is to establish a functional system that realizes the monitoring plan. Respondents were asked if they believe that sufficient number of qualified staffs are assigned in the projects for the monitoring responsibilities. Thirty four respondents

(87.2%) replied positively while 2(5.1%) were not content with the staffing for monitoring responsibilities and 3 (7.7%) are not sure about it.

The second question was about the tools, systems, and applications required for proper project monitoring. In this regard 87.2% of the respondents said that these resources were sufficiently available while 7.7% think differently and the remaining 5.1% could not agree or disagree on this issue.

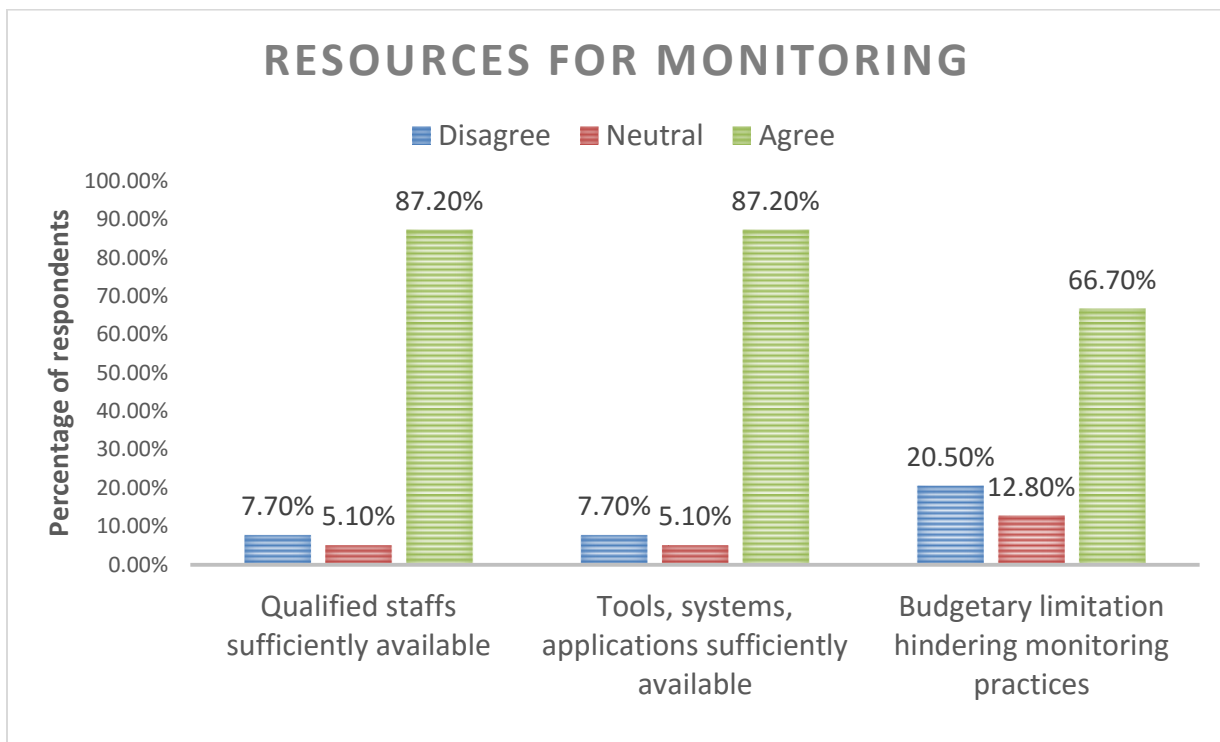


Figure 2 : Resource availability at projects

The third question was meant to check if monitoring activities were being constrained by budgetary limitations. A significant proportion of respondents, 26 (66.7%), felt budgetary limitation was hindering the monitoring practices while 8 (20.5%) stated differently and the remaining 5 (12.8%) were undecided. Respondents had a chance to reiterate their view on the budget issue towards the end of the questionnaire in the strengths-weaknesses and the challenges part. If similar reactions are received, that should be a concern to be taken seriously.

4.5 Performance Measurement Practices

In this section an assessment was done on the measurement and data collection activities. Measurement is one of the core activities in monitoring, and hence supportive factors such as the provision of training were also assessed.

The first question links monitoring planning to its implementation. Participants were asked if monitoring was being implemented based upon predetermined indicators and assumptions. A clear majority of the respondents (86.8%) agreed with the statement, 7.9% were doubtful and 5.3% disagreed. This is a show case for a monitoring plan that guides the practices.

The project manager should ensure from the start that the project has the right staffs to carry out the monitoring properly. As noted in the resources-for-monitoring section, a combined 12.8% of respondents didn't believe that 'a sufficient number of qualified staffs were assigned for the project monitoring responsibilities'. If there is such shortcomings in capabilities, the data collection and project performance monitoring requirements should be tailored to the skills of the available staffs. Respondents were asked if such flexibility existed and 33 (84.6%) consented, 4 (10.3%) disagreeing and 2 (5.1%) are not sure about it. So it could be concluded that tailoring the monitoring requirements to skills was a remedial taken by YOTEK to close down skills gap.

Obviously, 'tailoring the monitoring requirements to the skills of the staffs' could not be a complete solution to the skills deficits. Given the fact that 21 (53.8%) of the respondents were not trained in project management (as found out in the first section, personal profile) trainings that enhance the monitoring practices should have been a priority. However only about half of the respondents (51.3%) said that trainings were available for the monitoring team members and the staffs who contribute to the monitoring practices whenever the need arises. About equal number of respondents were either not sure on the availability of trainings (25.6%) or believed it was closer to none (23.1%).

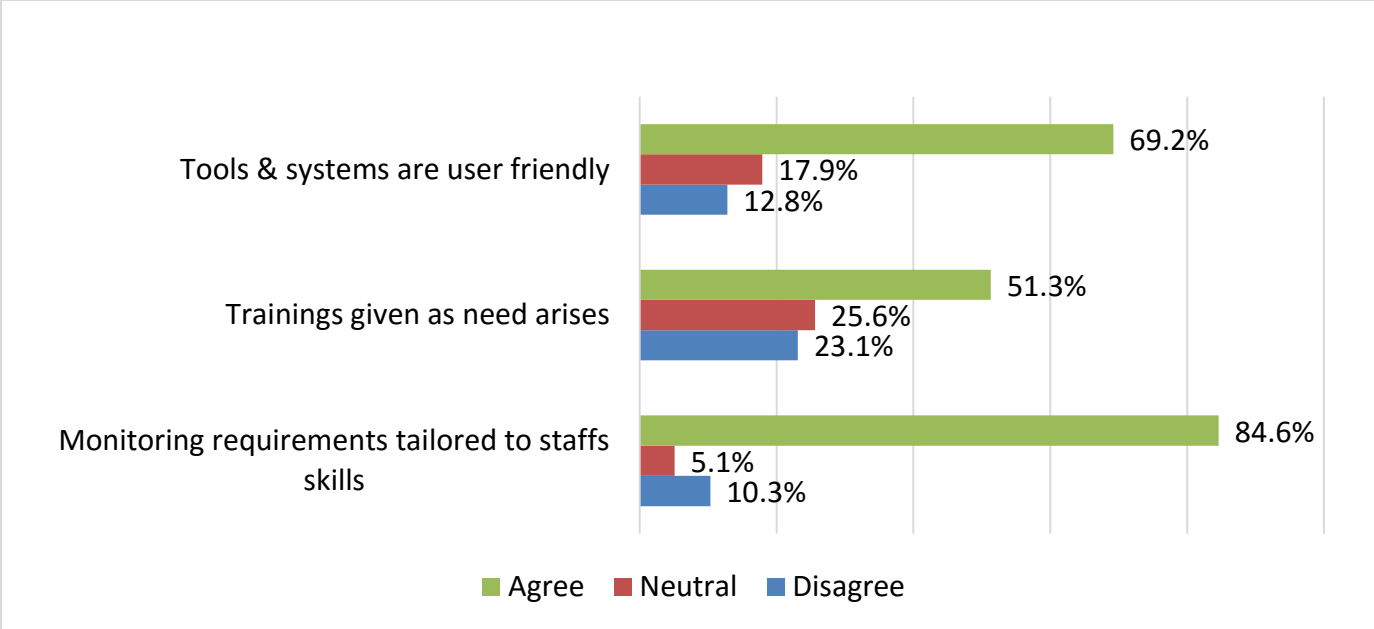


Figure 3 : Tailoring versus Training, and how friendly the monitoring system is

Participants of the study were also asked if the monitoring tools and systems were user-friendly and 27 (69.2%) of them thought so. Those who disagreed and who were not sure about it were 12.8% & 17.9% respectively. This was a plausible finding given the gaps observed so far in human resource qualification, in tailoring the monitoring requirements to the skills of the staffs, and in the provision of trainings. These gaps might be compounding each other and at this point a good number of staffs involved in monitoring may not be comfortable with the tools and systems.

The frequency of measurement and data collection on the implementation indicators was another question forwarded to respondents. The findings imply data freshness as 61.5% and 20.5% of respondents said that data was collected on a daily and weekly basis respectively. Only one respondent stated the frequency to be on monthly basis. The other positive side in this regard was the flexibility, as expressed by the remaining 15.4% respondents who said that the data collection frequency depends on the indicator being measured.

One problem in project monitoring is the decrease in focus as the project progresses. Respondents were asked if they feel their Project was going to be monitored strongly until completion. A combined 15.4% of them were reluctant to agree while the remaining majority (84.6%) perhaps observed no waning in the monitoring intensity and thus concluded it would go strongly to the end

The project environment is dynamic. Unanticipated changes happen with the project and its context, including in project assumptions and risks. Respondents were asked if such changes were being attentively looked at and the monitoring adapted accordingly. Most of the respondents (86.5%) said it was a routine to monitor for unanticipated changes. Only one respondent (2.7%) disagreed to this and the remaining 10.8% were not sure.

With regard to the methods used to measure project cost performance, activity based ratio was most common at 86.6%, while leading parameter and Earned Value Management were picked in 8.6% & 2.9% of the responses. Simplified Schedule Index, which is a task-level comparison of the work accomplished against the allocated time, was most popular as responded by 93.9% whereas Earned Schedule Management was selected as a time monitoring method by only 6.1% of respondents.

As per the selection made on suggested list of technologies the Digitalizing Construction Monitoring (DCM) was more in use at 76.9% than the Automated Cameras whereas Drones were yet to be used. Respondents didn't specify any other monitoring technology to the ones on the suggested list. Primavera seems a widely used application for monitoring as it was selected in 72.7% of responses, Microsoft Project coming second at 22.7%, and Project.net was less commonly used at 4.5%. The other applications in use as listed by respondents were Etabs and Eagle point.

4.6 Data Quality

The monitoring data should have the required quality if it is to serve its purpose. Data quality is measured through metrics that encompass different aspect of quality. The findings on the measures on data quality metrics is tabulated below

Attributes for data quality	% of respondents who . . .		
	Disagree	Not sure	Agree
Freshness	5.1	5.1	89.7
Relevance	5.3	5.3	89.5
Validity	2.6	10.3	87.2
Updated at regular, fixed interval	10.3	5.1	84.6
Auditability or verifiability	7.9	7.9	84.2
Consistency	8.1	8.1	83.8
Completeness	5.1	17.9	76.9
Reliability	10.3	15.4	74.4
No Information overload	25.6	17.9	56.4

Table 3: Responses on attributes for data quality

Equal number of respondents (5.1% each) was disagreeing or doubtful when asked if the data in use was recent enough and hence relevant. This data timeliness was approved by 89.7% of respondents, consistent with the daily, weekly, and flexible data collection schedules of 61.5%, 20.5% & 15.4% respectively observed earlier.

And the majority of respondents (89.5%) agreed that the data was relevant and thus serving the purpose it was gathered for. Indicators should measure, as directly and neatly as possible, the actual and intended performance levels if the data is to be accepted as valid. The data also needs to be verifiable and backed up by evidence as it has to stand any independent performance review. These two metrics of data quality, validity and verifiability, were agreed by 87.2% & 84.2% of the respondents respectively.

The data quality at YOTEK's projects could be rated as good if we are even to go by the relatively lower approval ratings for the metrics of consistency, completeness, and reliability. However, information overload should be addressed as a problem since 25.6% of respondents agreed to it while only 56.4% said that information overload is not a problem.

4.7 Reporting, Reviewing and Using Performance Information

Two positives from the previous discussions were data freshness and flexibility in measurement and data collection. Similarly respondents were asked if there was also flexibility to report whenever change occurs instead of scheduled reports. While 13.5% respondents implied reporting was strictly scheduled by disagreeing to the question, 8.1% were unsure, and 78.4% indicated that the report timing was flexible. It is good to have such flexibility as it gives room to align the timing and frequency of project reports as required by stakeholders

Projects should have an established communication plan that includes a distribution matrix for all project reporting documents. In this regard respondents were asked about the accessibility of usable data to those who need it. Almost all of them (94.9%) agreed, with only two respondents not sure about it.

The other important point about reports is the layout. Some recipients may ask for the one-pager project dashboard which needs few minutes to comprehend. Others may require detailed risk reports or the cost summary alone. Respondents were asked if reports are tailored to the management level or the audience they were being reviewed by. A majority 86.8% of respondents agreed, 7.9% disagreed and 5.3% were not sure if such report customization existed.

Performance reviews employ data collected through monitoring and contribute for the organizational learning system by identifying lessons and actions to improve

implementations. Stakeholders' involvement in reviews and the integration of their feedbacks in setting future performance targets was confirmed by 76.9% of respondents, while 12.8% disagreed and 10.3% were doubtful.

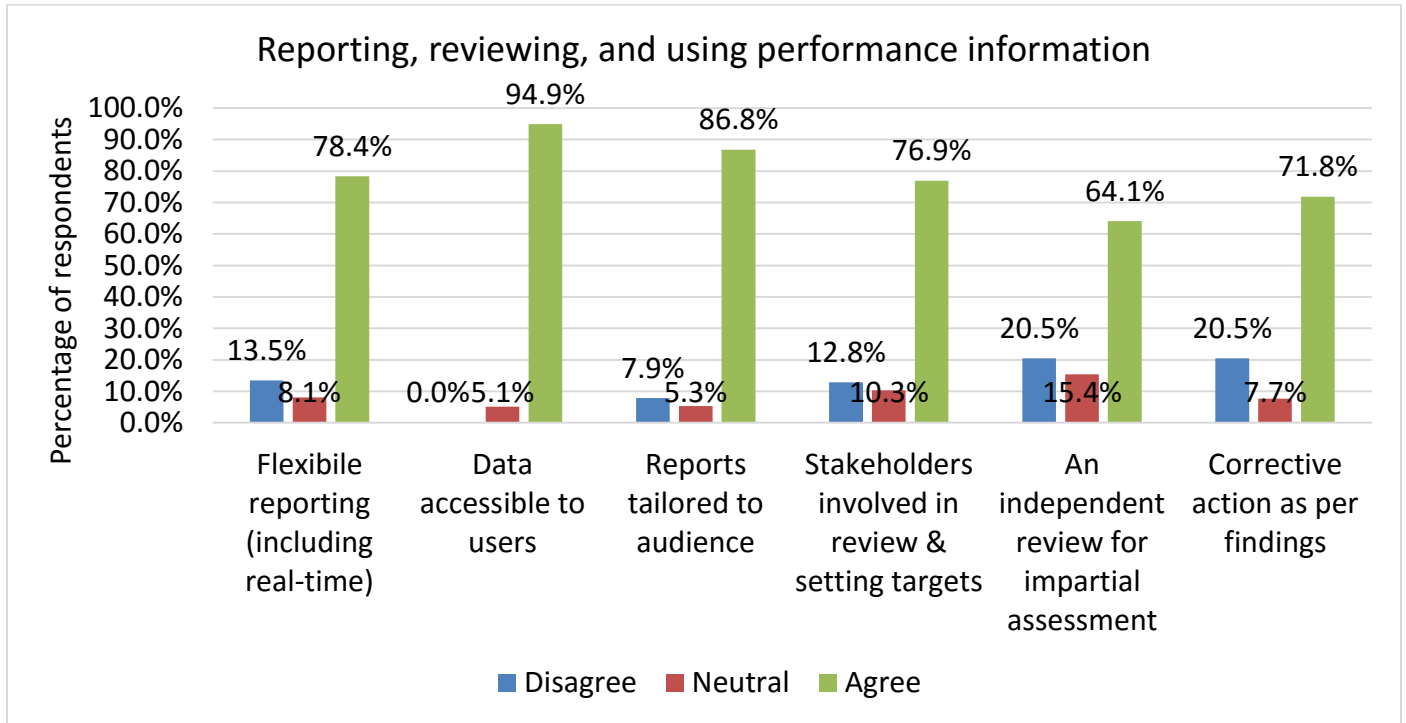


Figure 4: Reporting, reviewing, and using performance information

In YOTEK independent performance reviews aiming for unbiased, impartial assessment of the work accomplished are less common compared to stakeholders' reviews. Only 64.1% of respondents said to be aware of independent reviews, 20.5% of them disagreed and 15.4% are not sure. That is a credible finding since independent (external) reviews are not conducted as frequently as stakeholder (internal) reviews.

Eventually, the purpose of monitoring is to take corrective action if the project is not progressing as planned. The practice of taking a timely corrective action was apparent to 71.8% of respondents while 7.7% were not sure about this action/inaction. If 20.5% of respondents are saying that a timely corrective action was not being taken, it is

reasonable to conclude that either there are delays to correct deviations or there are total-inactions in significant number of instances.

Respondents were asked to rate the consistency (similarity) in project monitoring practices across YOTEK's projects. Out of the nineteen respondents who had worked in more than one project under YOTEK, 10.5% each rated the monitoring practices across projects as 'highly consistent' and 'moderately inconsistent'. The majority 79.0% rated it at 'Moderately consistent' implying that the project management approach in YOTEK is not integrated, but rather more of project-specific. One of the implications of not having consistency in the monitoring practices is that the staffs cannot be moved seamlessly across projects as they need to learn the peculiarities of each project.

4.8 Strengths, Weaknesses, and Challenges

Participants of the study were asked to list down the factors that were supportive to the practices of monitoring at YOTEK. They did the same on the factors that had been undermining the efforts towards effective monitoring. Finally they had to rate a suggested list of challenges to monitoring, with an option to add and rate more. The inclusion of these open-ended questions was intended to provide greater richness to the data collected so far through fixed-alternative questions.

4.8.1 Factors Supportive to Monitoring

About a third of the responses were excluded from analysis because they were monitoring practices by themselves, and not factors that contribute to the practice. Commitment of the staffs topped the list at 20%. Skilled manpower and the availability of tools and systems for monitoring are joint second, picked by 15% of the respondents each. That is in line with the high approval noted earlier for the availability of non-financial resources

Ranked	Factors supportive to Monitoring	Frequency	Percent
1	Committed staffs	8	21.6%
2	Skilled manpower	6	16.2%
2	Tools and system availability	6	16.2%
4	Safety management	4	10.8%
5	Communication within project team	3	8.1%
5	Project design and monitoring plan	3	8.1%
5	Construction quality	3	8.1%
8	Project organization	2	5.4%
9	Supportive management	1	2.7%
10	Trainings for the monitoring team	1	2.7%
	Total	37	100%

Table 4: Factors supportive to monitoring

The attention for safety management (work area safety) and the quality of the construction works were also mentioned as positives, but how these factors are supportive to monitoring was not clear from the responses. ‘Training for the monitoring team’ was selected as a supportive factor by one respondent, perhaps from among half of the staffs who had the opportunity for a training.

4.8.2 Factors Undermining Monitoring Activities

It is to be recalled that about half of the respondents (51.3%) were not content with training provisions for the staffs contributing to monitoring. Here again the limitation in training and development topped the list of factors that weaken the monitoring practice. Communication gap among stakeholders and not properly reviewing monitoring findings came joint second.

Ranked	Factors Undermining Monitoring Activities	Frequency	Percent
1	Training and development limitations	8	24.2%
2	communication gap among stakeholders	4	12.1%
2	Findings not properly reviewed for measures	4	12.1%
2	Ineffective management	4	12.1%
5	Monitoring skills lacking	3	9.1%
6	Design drawings incomplete and unclear	2	6.1%
7	Poor work ethics/sense of belongingness	2	6.1%
7	Safety concerns	2	6.1%
7	Salaries not competitive	2	6.1%
10	Monitoring technologies not up to date	1	3.0%
11	Work overload	1	3.0%
	Total	33	100.0%

Table 5 : Factors weakening the monitoring practices

Going into the details, the communication gap among stakeholders was a composite of deficits in interpersonal skills and dysfunctional internal communication, problems that could be linked with the fourth problem of not properly reviewing findings for measures. These problems erode the monitoring effectiveness as corrective actions will not be taken appropriately.

On assessing the monitoring practices at YOTEK construction PLC it was found out that the strengths and weaknesses were not exclusive to each other and at times they were project-specific or not observed in all projects. For instance ‘safety’, was listed as strength in one project and as a weakness in another. Identifying such factors helps to map (share) the strengths to other projects where it is noted as a weakness

Ineffective management, skills lacking in monitoring, and poor work ethics/sense of belongingness were the skill and attitudinal weaknesses on the side of the human

resource. Incomplete and unclear design drawings, and monitoring technologies not being up to date were the weaknesses in project design that impede monitoring.

4.8.3 Challenges to Monitoring

Based on the literature, a suggested list of seven challenges was forwarded for rating. Participants of the study were expected to add and rate more challenges but only three of them did so. Thus ranking of the challenges was done on the suggested list only by running One-sample Test. Most variables had a standard deviation of less than or closer to one, suggesting that the variables were interpreted similarly by the respondents.

A four-point scale was used for rating. A suggested challenge to be assigned “0” if its effect or impact is none, “1” stands for low, “2” for moderate, and “3” for high impact. The finding is tabulated below.

Ranked	Challenges to Monitoring	Mean	Std. Deviation
1	Budgetary constraint	2.19	0.822
2	Coordination and communication lapses in sharing findings	2.00	0.939
3	Inconsistency in Monitoring practices	1.64	0.931
4	Resources limitations (tools & applications)	1.62	1.037
5	Staffs lacking Monitoring skills	1.59	1.04
6	Poor project planning	1.57	1.259
7	Poor data quality, and data gaps	1.46	1.016

Table 6: Challenges to the monitoring practices

Additional challenges listed by respondents included unwillingness to use new monitoring methods, delayed projects, lack of accountability, resource conflict, resource fragmentation, and dependency conflicts.

Chapter Five

Summary, Conclusions, and Recommendations

5.1 Summary of Findings

One of the objectives of this descriptive research was to assess the project monitoring as practiced at YOTEK Construction PLC. It was found out that the monitoring practices were guided by plans that were communicated as of the start of projects. The majority of the respondents confirmed that the project plan includes the data collection tools, documented monitoring roles and responsibilities, and the acceptable levels of performance.

With regard to the resources required to realize the monitoring plan 87.2% of respondents agreed that qualified staffs, tools, systems, and applications for monitoring were sufficiently available. But a significant proportion of respondents, 26 (66.7%), believed that budgetary limitation was a hindrance.

Given the gaps in project management trainings, tailoring the monitoring requirements to the skills of the monitoring team was a sensible remedial taken at implementing the monitoring plan. The data measurement was frequent and with flexible timing, the monitoring practices as a whole being adaptive to unanticipated changes to the project assumptions and risks. Consequently, the data quality at YOTEK as measured by data freshness, relevance, validity, update regularity, verifiability, consistency, completeness, and reliability was good. However, information overload was a problem noted by 25.6% of respondents.

The data collected through monitoring should be reported, reviewed, and used properly if the monitoring practice is to serve its purpose. In this regard for 78.4% of respondents the report timing was flexible, allowing to report changes as they occur and as required by stakeholders. The practice in terms of data accessibility and customizing the reports

to the needs of the audience was even better as confirmed by 94.9% and 86.8% respondents respectively.

Whereas stakeholders' involvement in reviews and the integration of their feedbacks in setting future performance targets was confirmed by 76.9% of respondents, only 64.1% of respondents were aware of independent reviews aiming for unbiased, impartial assessment of the work accomplished. Another point of concern is that 20.5% of respondents didn't see a timely corrective action being taken, implying delays to correct deviations or total-inactions in significant number of instances.

It was found out that 79.0% of the nineteen respondents who had worked in more than one project under YOTEK rated the consistency in monitoring practices across YOTEK's projects as 'Moderate' while only 10.5% of them observed 'High consistency'. This implies that the project management approach in YOTEK was not integrated, but rather more of project-specific

Finally internal and external factors that support, constrain, or challenge the monitoring practices were identified and rated. Commitment of the staffs, skilled manpower, and the availability of tools and systems for monitoring were the top three supportive factors. That is in line with the high approval noted earlier for the availability of non-financial resources. Limitations in training and development, not properly reviewing the findings for corrective measures, and communication gap among stakeholders were the leading internal deficiencies weakening the practices.

And a rating on a suggested list of challenges showed budgetary constraints, coordination and communication lapses in sharing findings, and inconsistency in monitoring practices as the leading challenges affecting the monitoring.

5.2 Conclusions

Whereas local contractors are struggling to complete construction projects as per the plans and failing to be competitive as envisioned by the Ethiopian Construction Policy, their project monitoring practices need to be examined. Accordingly this research was done at YOTEK, one of the leading local construction firms, with the objectives to assess the monitoring practices and identify the factors and challenges influencing or affecting the practice. In a survey on its six projects at Addis Ababa, quantitative data was collected through census from the project staffs contributing to monitoring.

It was found out that YOTEK has commendable practices in terms of plans and provision of resources for monitoring. The data measurement performance has ensured data quality, with the only downside being information overload. The assessment on reporting, reviewing, and the use of performance information revealed mixed results. The report timing, data accessibility and customizing, and stakeholders' reviews were noted as positives. But timely corrective actions were not being taken in significant instances and that impedes one of the purposes of monitoring, which is getting projects back on track.

With regards to the factors supportive to monitoring, the non-financial resources top the list. Though the staffs contributing to monitoring were skilled, and mostly Engineers, they pronounced the need for training in project monitoring by listing 'limitations in training and development' as a factor that undermines the monitoring efforts. Reviews that fall short of corrective actions are reiterated as deficiencies along with communication gap among stakeholders.

Finally, a rating on a suggested list of challenges showed budgetary constraints, coordination and communication lapses in sharing findings, and inconsistency in monitoring practices as the top three challenges affecting the monitoring practices.

An interesting finding in this research was that the strengths and weaknesses were not exclusive to each other and at times they were project-specific or not observed in all projects. A factor listed as strength in one project was found out to be a weakness in another, in line with the inconsistency of the monitoring practices across projects that was noted earlier.

Other local construction firms may take the monitoring planning, resource provision, and data measurement practices at YOTEK as lessons or best practices. But they need to establish a standardized project monitoring procedure to be implemented consistently across all projects and improve on YOTEK's weaknesses such as financial constraints and gaps in taking timely corrective actions.

5.3 Recommendations

The monitoring practices at YOTEK could be improved further with the following practical recommendations that are based on the research findings:

- ✓ Based on skills gap analysis, YOTEK should provide trainings to the staffs involved in project monitoring
- ✓ YOTEK has to deal with its coordination and communication lapses in sharing and reviewing monitoring findings so as to take a timely corrective action
- ✓ YOTEK needs to improve the consistency of its monitoring practices so that monitoring resources can be utilized (or moved) optimally across projects
- ✓ YOTEK needs to resolve the financial constraint that is straining the monitoring practices

Suggestions for Future Research

This research assessed the monitoring practices at YOTEK's projects and made inductive statements while recognizing that some distinctiveness exists among projects. But the study was not detailed enough to establish relationships between variations in monitoring practices among projects and the corresponding project performances. Thus, the researcher suggests for a comparative study among projects to be made by relating the project success level with the monitoring practices so that refined conclusions could be made and more lessons could be drawn.

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Online Resources

<https://www.pmi.org/about/learn-about-pmi/what-is-project-management>

<https://constructionproxy.com/catalog/contractors-in-ethiopia>

<https://www.datapine.com/blog/data-quality-management-and-metrics/>

<https://www.constructiondive.com/news/the-benefits-of-employing-drones-in-construction/516713/>

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<https://www.slideshare.net/PrestonHealthcare/monitoring-and-evaluation-frameworks-logical-framework>

An Assessment of the Monitoring Practices in Projects Contracted to YOTEK Construction PLC

Questionnaire

Dear Sir/Madam,

I am a graduate student of the School of Commerce at Addis Ababa University. I am conducting a research on the 'The Monitoring Practices in Projects Contracted to YOTEK Construction PLC' in partial fulfillment of a degree in Masters of Arts in Project Management.

I am kindly asking you to participate in this study by responding to all the items attached in the questionnaire to the best of your knowledge. You are taking part in this research voluntarily and thus can terminate it at any time.

Your name and that of the project you are working on need not to appear in the questionnaire unless you wish so. The information you provide is confidential and will be used for academic purposes only. Your cooperation will be greatly appreciated.

With respect,

Zerabruk Bekele

911 19 00 29

Direction: Please provide the requested information on the space provided or by ticking on the choice that best describes your answer

Part I – Personal and project Profile

1. Your position/role at YOTEK (in the project) _____
2. Your level of education

①

Degree

②

Masters

③

Other (please specify) : _____

3. Your experience in project related jobs at YOTEK and other companies, if any (project planning, management, administration, monitoring and evaluation, etc) :

_____years

4. Have you been trained in project management?

①

Yes

②

No

5. If 'Yes' for #4, what was the highest level of training you received?

①

Masters

②

Bachelors

③

Certificate

④

Short term training

⑤

Other (please specify) :

6. What project type are you working on?

①

Building

②

Road

7. Who monitors this project?

①

A monitoring team dedicated to and based in this project

②

A centralized monitoring team that has also responsibilities to monitor other projects under YOTEK

Part II : Planning for Effective Monitoring

The following statements assess the existence of a project plan that guides the monitoring practices.

1. All acceptable data collection tools are selected before project implementation starts

①	②	③	④	⑤
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree

2. Indicators to be measured are noted in the planning document and communicated with all team members and stakeholders.

①	②	③	④	⑤
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree

3. Acceptable levels of performance are identified, so that it is clearly understood when the project begins to get out of track

①	②	③	④	⑤
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree

4. The roles and responsibilities of staff in monitoring are clearly defined and documented

①	②	③	④	⑤
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree

5. Your project is being monitored as per the documented policy or guideline for monitoring

①	②	③	④	⑤
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree

Part III: Resources for Monitoring

The following statements are meant to check the availability of the resources that help your project to establish a functional monitoring system

1. Sufficient number of qualified **staffs** are assigned for the project monitoring responsibilities

①	②	③	④	⑤
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree

2. The **tools, systems, and applications** required for proper project monitoring are sufficiently available

①	②	③	④	⑤
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree

3. **Budgetary** limitation is hindering the monitoring practices

①	②	③	④	⑤
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree

Part IV. Performance Measurement

The factors, tools, and practices that support the measurement and data collection activities will be examined in this section

1. Monitoring is being implemented based upon predetermined indicators and assumptions

①	②	③	④	⑤
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree

2. Data collection and project performance monitoring requirements are tailored to the skills of the staffs involved

① Strongly disagree ② Disagree ③ Neither disagree nor agree ④ Agree ⑤ Strongly agree

3. Trainings are given for the monitoring team members and the staffs who contribute to the monitoring practices whenever the need arises

① Strongly disagree ② Disagree ③ Neither disagree nor agree ④ Agree ⑤ Strongly agree

4. The monitoring tools and systems are user-friendly

① Strongly disagree ② Disagree ③ Neither disagree nor agree ④ Agree ⑤ Strongly agree

5. How often is measurement taken and data collected on the implementation indicators?

① Daily ② Weekly ③ Every two weeks
④ Monthly ⑤ Depends on the indicator being measured

6. It looks that this Project is going to be monitored strongly until completion. (no decrease in focus as the project progresses)

① Strongly disagree ② Disagree ③ Neither disagree nor agree ④ Agree ⑤ Strongly agree

7. Unanticipated changes with the project and its context, including any changes in project assumptions and risks are being attentively looked at

1

Strongly disagree

2

Disagree

3

Neither disagree nor agree

4

Agree

5

Strongly agree

8. Which of the following methods are used in this project to measure cost performance?

Activity based ratios between the earnings and expenditures of the project activities such as

- o **Efficiency** = Actual Performance / Planned Performance

Leading parameter where one or more of the major types of work are picked as measures of the performance of the whole project

Earned Value Management

Please list down if other methods are in use for cost monitoring

Simplified Schedule Index : a task-level comparison of the work accomplished against the allocated time

Earned Schedule Management:


Please list down if other methods are in use for schedule monitoring

10. Which of the following monitoring technologies are used in this project?

- Digitalizing Construction Monitoring (DCM)
- Hi-Resolution Automated Cameras
- Sensors such as Ground Penetrating Radar (GPR)
- Drones

If more technologies are in use, please specify below

11. Which of the following applications are in use in your project? (Please tick)

Primavera		
Microsoft project		
Project.net		
EMDESK		
Some more . . .	please list	

12. Have you worked in other project(s) under YOTEK?

①

Yes

②

B. No

13. If 'Yes' for #12 above, how do you rate the consistency (similarity) in project monitoring practices across YOTEK's projects

①

Highly consistent

②

Moderately consistent

③

Moderately inconsistent

④

Highly inconsistent

v. Data Quality

Now you are going to look at the quality aspects of the monitoring data that is collected at your project

- 1. Freshness :** The data being used is recent enough and hence relevant

①	②	③	④	⑤
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree

- 2. Update frequency:** The data is updated at regular, fixed (known) interval

①	②	③	④	⑤
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree

- 3. Reliability:** Measurement of the indicators is conducted the same way every time (system stability and consistency)

①	②	③	④	⑤
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree

- 4. Validity:** Indicators measure, as directly and neatly as possible, the actual and intended performance levels

①	②	③	④	⑤
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree

- 5. Consistency:** As the data type is the same over time, comparisons among different time periods can be made easily

①	②	③	④	⑤
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree

6. Auditability: The data is verifiable and backed up by evidence

①	②	③	④	⑤
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree

7. Completeness: The data is sufficient (enough) for the information to be relevant and useful

①	②	③	④	⑤
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree

8. Information overload: The data is too much and thus prevents visibility

①	②	③	④	⑤
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree

9. Relevance: The data serves the purpose it is gathered for

①	②	③	④	⑤
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree

VI. Reporting, Reviewing and Using Performance Information

1. There is a flexibility to report whenever change occurs instead of scheduled reports (**Real-time reporting**)

1

Strongly disagree

2

Disagree

3

Neither disagree nor agree

4

Agree

5

Strongly agree

2. The data is easily available to and usable by those who need it (**Accessibility**)

1

Strongly disagree

2

Disagree

3

Neither disagree nor agree

4

Agree

5

Strongly agree

3. Reports are tailored according to the management level or the audience they are being reviewed by

1

Strongly disagree

2

Disagree

3

Neither disagree nor agree

4

Agree

5

Strongly agree

4. Key stakeholders are involved in reviewing implementation and their feedback integrated in setting future performance targets

1

Strongly disagree

2

Disagree

3

Neither disagree nor agree

4

Agree

5

Strongly agree

5. An independent performance review is done so as to have unbiased, impartial assessment of the work accomplished

1

Strongly disagree

2

Disagree

3

Neither disagree nor agree

4

Agree

5

Strongly agree

6. If the project is not progressing as planned, a timely corrective action is taken as per the findings of the monitoring

①

Strongly
disagree

②

Disagree

③

Neither disagree
nor agree

④

Agree

⑤

Strongly
agree

VII. Strengths and weaknesses

1. Please list the top three strengths at your project that you think are contributing towards having effective monitoring

i. _____

ii. _____

iii. _____

2. Please list the top three weaknesses at your project that you think are undermining the efforts towards having effective monitoring

iv. _____

v. _____

vi. _____

VIII. Challenges affecting the monitoring practices

Finally, you are kindly asked to rate how badly a suggested list of challenges are affecting the monitoring activities and also include any missing challenges and rate them as well.

No	Challenges affecting the monitoring practices	Level of effect			
		None	Low	Moderate	High
1	Poor project planning				
2	Budgetary constraint (insufficiency)				
3	Enough resources not allocated (such as tools & applications)				
4	Staffs lacking Monitoring skills				
5	Poor data quality and data gaps				
6	inconsistency in monitoring practices				
7	coordination and communication lapses in collecting and sharing monitoring findings				
	If there are more challenges, please list and rate				
i					
ii					
lii					

Thank you !